

Ex 1.3

Q1 (i) $y+1 = 3(x-4)$
 $y+1 = 3x-12$
 $3x-y-13 = 0$

(ii) $y+2 = -3(x+5)$
 $y+2 = -3x-15$
 $3x+y+17 = 0$

Q2 $y-1 = \frac{2}{3}(x+3)$
 $3y-3 = 2x+6$
 $2x-3y+9 = 0$

Q3 L: $x-3y+4 = 0$

(i) $m = \frac{-1}{-3} = \frac{1}{3}$

(ii) $(3, -4)$ $m = \frac{1}{3}$
 $y+4 = \frac{1}{3}(x-3)$
 $3y+12 = x-3$
 $x-3y-15 = 0$

Q4 A(3, -1) B(4, 5) C(-2, 1)

(i) $m_{AB} = \frac{5+1}{4-3} = \frac{6}{1} = 6 \Rightarrow m_{\perp} = -\frac{1}{6}$

(ii) $(-2, 1)$ $m = -\frac{1}{6}$
 $y-1 = -\frac{1}{6}(x+2)$
 $6y-6 = -x-2$
 $x+6y-4 = 0$

Q5 $2x - 3y + 5 = 0$ $m = \frac{-2}{-3} = \frac{2}{3}$

$3x + ky - 8 = 0$ $m = \frac{-3}{k}$

$$\frac{2}{3} \times \frac{-3}{k} = -1$$

$$\frac{-2}{k} = -1$$

$$-2 = -k$$

$$k = 2$$

Q6 $3x + 4y - 7 = 0$ $m = \frac{-3}{4}$

$2y - tx - 6 = 0$ $m = \frac{t}{2}$

$$\frac{-3}{4} \times \frac{t}{2} = -1$$

$$\frac{-3t}{8} = -1$$

$$-3t = -8$$

$$t = \frac{8}{3}$$

Q7 $2x + ky - 8 = 0$ $(3, 1)$

$$2(3) + k(1) - 8 = 0$$

$$k = 8 - 6$$

$$k = 2$$

Q8 $x - 3y - 6 = 0$

$$x = 0 \quad -3y = 6$$

$$y = -2$$

$$(0, -2)$$

$$y = 0 \quad x - 6 = 0$$

$$x = 6$$

$$(6, 0)$$

Q9 Slope of $h = \frac{10+2}{-4-6} = \frac{12}{-10} = -\frac{6}{5}$

$m_{\perp} = \frac{5}{6} = \text{Slope of } h$

Slope of $h = \frac{-a}{b}$

$\frac{-a}{6} = \frac{5}{6} \Rightarrow a = -5$

Q10

$2x - 3y + 6 = 0$

(i) cut $x \Rightarrow y = 0$

$2x + 6 = 0$

$2x = -6$

$x = -3$

$C(-3, 0)$

(ii) $2x - 3y + 6 = 0 \quad m = -\frac{2}{3} = \frac{2}{3} \Rightarrow m_{\perp} = -\frac{3}{2}$

$y - 0 = -\frac{3}{2}(x + 3)$

$2y = -3x - 9$

$3x + 2y + 9 = 0$

Q11 $m = -\frac{2}{5} \quad \text{pt } (-2, 3)$

$y - 3 = -\frac{2}{5}(x + 2)$

$5y - 15 = -2x - 4$

$2x + 5y - 11 = 0$

Q15

$$3x - y + 4 = 0 \quad m = \frac{-3}{-1} = 3$$

$$\begin{array}{r} \text{Pt of } \ell : \quad 2x + 3y = 12 \quad (\times 4) \\ \quad \quad \quad 3x - 4y = 1 \quad (\times 3) \\ \hline \quad \quad \quad 8x + 12y = 48 \\ \quad \quad \quad 9x - 12y = 3 \\ \hline \quad \quad \quad 17x = 51 \end{array}$$

$$x = 3$$

$$3(3) - 4y = 1$$

$$-4y = -8$$

$$y = 2$$

(3, 2)

New line containing pt (3, 2) and $m = 3$

$$y - 2 = 3(x - 3)$$

$$y - 2 = 3x - 9$$

$$3x - y - 7 = 0.$$

Q17

$$3x - 2y + 7 = 0$$

$$5x + y + 3 = 0 \quad (\times 2)$$

$$3x - 2y + 7 = 0$$

$$10x + 2y + 6 = 0$$

$$13x + 13 = 0$$

$$x = -1$$

$$3(-1) - 2y + 7 = 0$$

$$-2y = -4$$

$$y = 2$$

(-1, 2)

$$\ell_2: 5x + y + 3 = 0 \quad m = \frac{-5}{1} = -5$$

Eqn of line containing (-1, 2) and $m = -5$

$$y - 2 = -5(x + 1)$$

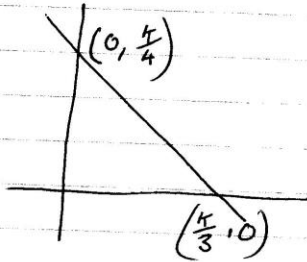
$$y - 2 = -5x - 5$$

$$5x + y + 3 = 0$$

Q18 $3x + ky = k$

cuts x at $y=0$: $3x = k$
 $x = \frac{k}{3}$ $(\frac{k}{3}, 0)$

cuts y at $x=0$: $ky = k$
 $y = \frac{k}{4}$ $(0, \frac{k}{4})$



Area = $\frac{1}{2}$ base \times h = 24

$\frac{1}{2} (\frac{k}{3}) (\frac{k}{4}) = 24$

$\frac{k^2}{24} = 24$

$k^2 = 576$

$k = \pm \sqrt{576}$

$k = \pm 24$

$k = 24$, as cuts positive axis

Q19

$2x - 3y + 8 = 0$

// Line $2x - 3y + k = 0$

$m = \frac{-2}{-3} = \frac{2}{3}$ pt (4, 2)

$y - 2 = \frac{2}{3}(x - 4)$

$3y - 6 = 2x - 8$

$2x - 3y - 2 = 0$

Q20

$$4x + y = 6$$

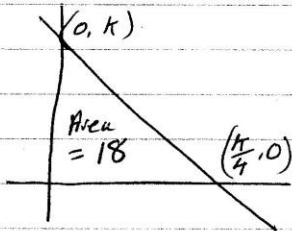
$$4x + y - 6 = 0$$

|| line : $4x + y - k = 0$

↳ cuts x : $4x = k$

$$x = \frac{k}{4} \quad \left(\frac{k}{4}, 0\right)$$

cuts y : $y = k \quad (0, k)$



$$\text{Area} = \frac{1}{2} \text{ base} \times \text{height} = 18$$

$$\frac{1}{2} \left(\frac{k}{4}\right) (k) = 18$$

$$\frac{k^2}{8} = 18$$

$$k^2 = 144$$

$$k = 12$$

Eqn is $4x + y - 12 = 0$.